DOCUMENT RESUME

ED 042 226 CG 005 824

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TITLE	Computer Diagnostics.
INSTITUTION	American Educational Research Association, Washington, D.C.; Palo Alto Unified School District, Calif.
PUB DATE	Mar 70
NOTE	9p.; Paper presented at the American Educational Research Association Convention in Minneapolis, Minnesota, March 2-6, 1970
EDRS PRICE	EDRS Price MF-$0.25 HC-$0.55
DESCRIPTORS	*Computer Oriented Programs, *Counseling, *Guidance, Guidance Counseling, *Guidance Functions, *Guidance Objectives, Guidance Programs, Programed Instruction, Systems Analysis

ABSTRACT

The report deals with the influence of computer technology on education, particularly guidance. The need for computers is a result of increasing complexity which is defined as: (1) an exponential increase of information; (2) an exponential increase in dissemination capabilities; and (3) an accelerating curve of change. Listed are five functions of the computer in guidance: (1) data gathering; (2) storage; (3) manipulation; (4) retrieval; and (5) dissemination. Computer technology and information is extremely useful for good decision making. Computer based counseling gives equal treatment to all students and eliminates the student's need for role playing (usually necessary when interacting with people of importance, such as counselors). However, the system does not fulfill all the student's needs and institutional guidance will remain. Therefore, the document implies that new skills will be required of the guidance specialist which in turn necessitates changes in counselor training programs. (MC/Author)

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COMPUTER DIAGNOSTICS

by

Dr. Murray Tondow

I have found that for me it is usually a disaster to be one of the last speakers on a panel. No matter what I plan to say somehow it gets said before my turn comes. Today marks another personal tragedy.

I perceive the title (not my choice) as dealing with the assistance for the individual in making decisions. I'd like to start with some remarks designed to establish a frame of reference for what follows.

I happen to be one of those who think that much of what passes for education today will soon be gone -- five, maybe ten years . God knows we are all trying, but the size and age of the educational establishment is such that most energy and resources are absorbed in just making the thing go. The result is that we lack the force for meeting the rapid and continuous call for change that we hear from our consumers. The causes for these changes are many. Some good, some not so good. To list just a few: (in no particular order of importance) taxes, race, relevance, increased importance of education to the society.

Guidance shall perhaps be the first casualty of change -- or the first to benefit -- depending on ones perception. Why guidance?

Because:

1. It is vunerable -- viewed by many educators as peripheral -- expendable -- misunderstood.

CG 005 824

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2. It's essence mirrors the reality of life. It tries to make sense out of stimulus overload that students face. Data reduction and assessment if you will, so that personal decision-making is possible. And that is a major part of life -- trying to assess information to make better decisions to improve one's life. Reading and writing and algebra are not life. That is, they are somewhat removed from what are the mechanics and vicissitudes of life. They are tools of living. Guidance comes closer to the act of living.

I think we are now bearing witness to a profound change in guidance; it's structure, process and form. This symposium is an example of that change.

The computer is not so much a cause of change as it is a force that allows change. It is, at least, a primary tool of quality control in that it offers positive options for change via data storage, analysis and retrieval.

The major issue here is not one of technology -- it is one of complexity. What we are now experiencing in the Guidance-Computer interface is a testing of the limits. An articulation of purpose, if you will.

As life becomes increasingly more complex there is a greater need for some assistance in making good decisions. For our purposes today I would operationally define complexity as:

a) exponential increase of information

b) exponential increase in dissemination capabilities

c) both of which result in an accelerating curve of change.

In this environment, intuition and personal experience count for less in decision making. One needs relevant experiences to use in decision-making; and that is getting to be more and more difficult to find in one's past. Without the relevance factor the use of past experience in decision making is not much removed from random behavior.

Obviously the computer has a unique role to play especially vis-a-vis the storage and retrieval of information. Particularly if you define good decision-making in terms of utilization of relevant information. For our purposes today we can look at storage and retrieval as having five critical aspects. These are: 1) data gathering, 2) storage, 3) manipulation, 4) retrieval, 5) dissemination. Because each is important, I would like at this time to expend some attention on each of the five aspects.

1. Data Gathering. The goal here is relevance. However, relevance is empirical not apriori. You cannot be sure any given data is relevant if you do not have it. Thus a certain amount of overload must occur. Through assessment meaningful data reduction and change in the data base element are possible.

Perhaps an example would be in order. Some years ago we were asked by counselors to develop an elaborate and complex attendance system which would alert counselors to attendance styles of their students, period by period, day by day, and so on, throughout the year. The apriori judgment was that given this information counselors might catch serious problems early enough to help prevent school dropouts. It was exciting to us. It gave us a chance to take a dull necessity (attendance) and turn it into a viable educational

service. Within six months the counselors returned and pleaded that the service stop. It seems that the reality of day-to-day counseling did not leave them sufficient time to analyze the output. As the printouts mounted so did their guilt. The only answer was to cut it off. What seems quite relevant in an apriori sense proved not to be so in an empirical sense. The data may be of value in the abstract, but if one cannot use it then it is of no value in the real sense.

2. Storage. This is essentially a two part problem; technical and logical. The technical aspect presents no insurmountable problems. The hardware and software that exists are quite adequate.

The logical aspect relates primarily to the model for storage. I shant dwell on this point since the papers today present examples of different models possible.

3. Manipulation. The essential goal here is data reduction. There are two concerns here; oversimplication of data, and physiological capacity.

Let me explain: There are over 2,000,000,000 people on this earth all very busy doing their thing. Every night at around 6:00 P. M. some newsman gives you an abstract of the activities of 2,000,000,000 people over a 24 hour period -- all in fifteen minutes. Is there any surprise we have a communication gap. It seems to me that such outlandish abstractions must lead to distortions due to oversimplication. This is something we must guard against in guidance information systems. In order to make sure the counselor has time to read the printout we are often pushed to reduce a statement concerning twelve years of a student's life into a two minute printout. Surely something of value has got to be lost.

The physiological aspect relates to our rapid information increase (doubles every 8 years or so) and our slow genetic change (no serious change in the last 50,000 or more years). Thus there is more and more to read, but the eyes and the brain have not changed -- they can just absorb so much in any given time.

I'm reminded of a cartoon I recently saw. Two men at a computer. One says,

"This computer prints at 5600 lines per minute."

The other man (the boss) responds,

"Find me some one who reads at 5600 lines a minute."

Thus good data reduction is a matter of balance between distortion (too much reduction) and too much (overload). By using the computer to continually restructure the data stored so that we can meaningfully abstract larger and larger chunks we mirror phylogenetic evolution and truly utilize the computer as an extension of man -- not just a high-priced calculator.

4. Retreival. This is a human problem. What format represents the best communication mode for a given task is one part. When one retrieves is another aspect. One of the more obvious points that was driven home to us in our Computer-Based Counseling project was this one of times. It was not enough to individualize the dialogue for each student by way of computer terminals. Not all students were ready to make decisions about the same school matters at the same time.

5. Dissemination. I see this as essentially a determination of what is the best delivery system. Let me refer once again to the computer based counseling project for an example. We found that hard copy was the most effective computer

output for counseling students; that a terminal that had printout capabilities so that the student could take the results of his session with the computer home and study it at his leisure. Thus several weeks after his actual session the student had all the data still available -- no chance for error. Another plus was that students could share the experience with parents via the print-out.

Thus from this perspective "Computer Diagnostics" is really concerned with optimizing a mix of information theory and computer technology so as to maximize opportunity for good decision-making.

What form will this computer-guidance interface take? I think within the next decade this interface will result in an insurance utility quite independent of school. There are several reasons for this possibility:

1. Data needs to be stored by individual, not by subject matter, or test, or any other educational rubric.
2. The more longitudinal the data, the more predictive.
3. The time to begin the data base begins before school and the need continues after school. In addition, non-school data is essential in any guidance service that is consumer oriented.

One strength of such a utility is that the man-machine system interface can have the quality of privileged communication. While data is neuter it can, and often is, used in a punitive manner. By keeping the relationship between the individual and the computer outside of institutional constraints,the individual has greater control and protection.

An added plus is that the individual chooses when and what his experiences are to be with the computer. As was stated earlier, information and decision

needs are a very individual matter. Not at all the same in terms of time and nature for each individual.

Such a system would represent the very essence of the democratic process: equal treament for all. In the Computer-Based Counseling project previously mentioned, this point is strongly made by the students. Namely, that they felt the computer treated them no differently than any other student. In their eyes it was absolutely fair. Furthermore, they can be themselves and not role play as is necessary when interacting with people of importance and power such as the counselor.

Such a system, while perhaps best for information/decision making, is not the totality of the behaviorial skills and assistance a student needs. Thus the institutional aspect of guidance will remain. I do believe that school guidance will in the future deal primarily with the art and skill of group interaction. Thus the school guidance specialist, with computer support will utilize the techniques of simulation and gaming in order to assist in offering the widest experience in behavior development. This activity requires an institutional setting.

And finally in passing, because time is soon to run out on me, let me merely make explicit without elaboration what is implied in these remarks. Specifically, a new set of skills for the guidance specialist. This in turn has direct implications for the Counselor Training Programs.

In summary the, I have presented one persons perception concerning the changing face of guidance. My position has been that change continues to impose itself upon education in general and guidance in particular, and that

computer technology has a unique role to play in these changes.

The precise nature of that role will be determined by people. The central issue is how do we want to utilize this power to help us move to where we need to be in the service of people.

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